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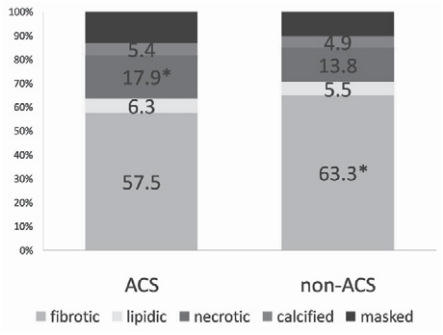
With iMap, plaque was characterized as fibrotic, lipidic, necrotic, and calcified.
Results: Lumen volume and lumen length were similar in both groups and vessel volume and plaque volume were significantly higher in ACS group (plaque volume; 179.7mm^3 vs. 118.4mm^3, P=0.0016). A ratio of necrotic plaque was significantly higher in ACS group (18.0% vs. 13.8%, P=0.014), and a ratio of fibrotic plaque was significantly lower in ACS group (57.5% vs. 63.4%, P=0.03).



Conclusions: With "iMap", more necrotic plaque was detected in ACS lesion than in stable lesion. "iMap" is useful device to assess the plaque component and could detect the unstable plaque in coronary intervention.

TCT-357

Comparison of Virtual Histology and iMAP in Tissue Characterization by Intravascular Ultrasound

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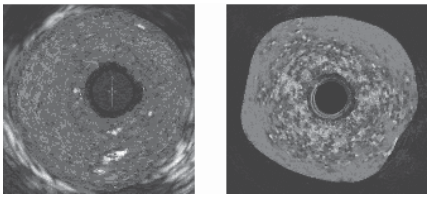
Background: Tissue characterization by intravascular ultrasound has played an important role in intervention cardiology. The aim of this study was to compare Virtual Histology with iMAP in tissue characterization.
Methods: We examined 72 cross-section areas in consecutive 7 patients observed simultaneously by Virtual Histology and iMAP.
Results: There were good correlation between Virtual Histology and iMAP in vessel area (r=0.90, p<0.01) and lumen area (r=0.85, p<0.01). However, in comparison of % plaque area with each plaque components, there were not good correlation between Fibrous vs. Fibrotic (r=0.30, p<0.01), Fibro-Fatty vs. Lipidic (r=0.12, p=0.31), Necrotic Core vs. Necrotic (r=0.16, p=0.18), and Dense Calcium vs. Calcified (r=0.62, p<0.01). There were markedly differences especially in calcified or plaque-rich, gray-scale-echo decreasing lesion. This image shows the difference in plaque-rich lesion between Virtual Histology (left) and iMAP (right) on same cross-section area.
Conclusion: It is necessary to understand differences between Virtual Histology and iMAP for judgment of the tissue characterization, because there are markedly differences between Necrotic



Core and Necrotic in gray-scale-echo decreasing lesion.

TCT-358

Use of IVUS during Coronary Interventions Improves Clinical Outcome. Results from Large Single Center Study

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Background: Widespread use of PCI for coronary revascularization prompts interventionalists to handle complex lesions, in different types of pts, with multiple techniques. IVUS could improve procedure results, expecially in complex settings such as multivascular pts, bifurcations, left main, high Syntax score etc. *Purpose.* Evaluation of IVUS use in large real-world PCI populations in term of MACCE in acute and long-term outcome.
Methods: From 01/01/2005 to 30/09/2009 all pts undergone to PCI, primary PCI included, were consecutively enrolled and divided in two groups: with IVUS guidance (G1) and without (G2). Clinical follow-up was completed with ambulatory visit or phone contact at 30 days, 1, 2 and 3 year follow-up.
Results: 7616 consecutive pts were enrolled: 1108 (14.5%) (G1) with IVUS guidance and 6508 (85.5%) (G2) without. Clinical characteristics were similar: diabetes 16.1 % in G1 and 15,8% in G2; renal failure 6.9 % in G1 and 6.8% in G2. Previous MI 31% in G1 and 30.9% in G2; previous PCI 40.1% in G1 and 39.8% in G2 while CABG 15% vs 15.1%, respectively. Indications for PCI were: stable angina 71.4% in both; unstable 24.6% in G1 and 19.7% in G2 and for AMI 4% in G1 and 9.2% in G2 (p>0.05). In both groups, PCI was performed for 69% in one vessel, 24,8% in two and 6.2% in three vessels. Complete revascularization was achieved in 69% of pts in both. Bare metal stent were used in 21% and drug eluting in 79%. Complex procedures were 35% in G1 vs. 15% in G2; p>0.05. In following table MACCE are showed:

	G1 (n=1108)	G2 (n=6508)	P value
In-hospital death	9 (0.8)	40 (0.6)	0.44
In-hospital MACCE (%)	126 (11.4)	920 (14.1)	0.01
MACCE @ 30 days (%)	n=1099 17 (1.5)	n=6468 175 (2.7)	0.02
MACCE @ 1 yr (%)	n=1003 123 (12.3)	n=6422 867 (13.5)	0.28
MACCE @ 2 yrs (%)	n=795 77 (9.7)	n=4685 492 (10.5)	0.48
MACCE @ 3 yrs (%)	n=518 32 (6.2)	n=3054 217 (7.1)	0.46

Conclusions: Results of this large serie showed a significative better outcome of PCI with IVUS guidance than without IVUS. A significative reduction of MACCE was observed in acute e 30-days follow-up. Long-term MACCE were similar in both groups, in spite of more complex PCI in IVUS group.

TCT-359

Images of Human Coronary Atherosclerosis From a Hybrid Intravascular Ultrasound and Optical Coherence Tomography Catheter

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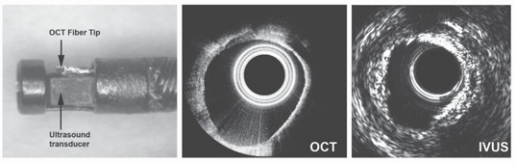
Background: Conventional intravascular ultrasound (IVUS) provides information about the plaque and lumen area of coronary arteries and can assist with stent sizing and confirmation of stent apposition. Aside from detecting calcifications, IVUS has a limited ability to identify tissue composition. Optical coherence tomography (OCT) has better resolution and tissue contrast than IVUS, enabling it to reliably identify thrombus, necrotic cores, fibrous caps and other features of interest. However, OCT is limited by its short penetration depth and inability to see through blood. We developed an imaging catheter capable of generating IVUS and OCT images at the same cross-section to further assess the potential synergies of these two modalities.
Methods: We built a 4F intravascular imaging catheter consisting of a 42MHz broadband ultrasound transducer and an OCT fiber optic assembly mounted at the distal tip of a torque cable. The IVUS and OCT imaging components were precisely aligned to produce simultaneous images of the same cross-section within a vessel. Human coronary arteries collected at autopsy were perfusion fixed in formalin and cut into segments 10-20 mm in length. Simultaneous image acquisition took place using the hybrid IVUS / OCT system at 250 micron increments along the length of each segment.
Results: 31 segments from 11 coronary arteries collected from 7 human autopsies were imaged successfully. A broad range of normal, calcified, lipid-rich and fibrous regions were seen. Examples demonstrating the potential synergy of a hybrid IVUS / OCT system for tissue characterization will be presented, along with corresponding serial histology and micro-CT images.



Conclusion: A hybrid IVUS / OCT system has been built at a scale suitable for use in human coronary arteries to overcome many of the limitations of either imaging modality on its own.

TCT-360

Difference of Heterogeneity of Neointima Thickness in Daibetic Patients between Sirolimus and Paclitaxel-Eluting Stents by Optical Coherence Tomography Analysis

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Background: Diabetes Mellitus is the major predictor for target lesion revascularization even in the drug eluting stent era. However, we have reported the difference of vascular response in diabetes Mellitus (DM) patients treated with Sirolimus (SES) - and Paclitaxel-Eluting Stents(PES). (Nasu et al, Circulation supple 2009)
Purpose: The purpose of this study was to evaluate the difference of neointimal thickness heterogeneity between SES and PES in patients with DM using Optical Coherence Tomography (OCT) imaging.
Methods: We enrolled non-restenotic 79 patients (41 patients with SES including 20 DM patients and 38 patients with PES including 18 DM patients) were imaged with motorized OCT pull back system (1mm/s) at 9 month follow up and analyzed at 1mm interval of 1mm. The NIH heterogeneity was evaluated by the heterogeneity index calculated as (maximum NIH - minimum NIH)/maximum NIH and difference of maximum NIH and minimum NIH. Vascular lumen symmetry index was assessed as minimum lumen diameter/maximum lumen diameter.
Results: However, average NIT in DM group was similar to that in non-DM group after PES implantation, average NIT in DM group was thicker than that in non-DM group after SES implantation. However, the heterogeneity index with DM group was significantly lower than non DM group in patients with SES, no difference was found in patients with PES according to the presence or absence of DM.

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